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EXAMINER

VINH, LAN

ART UNIT PAPER NUMBER

1765

DATE MAILED: 06/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/682,978

Applicant(s)

DUTRA ET AL.

Examiner

Lan Vinh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 3/17/2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-7, 9, 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Frankel et al (US 6,444,037)

Frankel discloses an apparatus/chamber for fabricating an integrated circuit. The apparatus/chamber having chamber wall/claimed interior chamber surface, the chamber wall /interior chamber surface comprises of aluminum/claimed a first material, a fluorine-based gas may begin to contaminate or to react with the aluminum chamber wall (col 38, lines 35-45), which reads on a substance incorporated in the first material.

Regarding claims 1-7,9, it is noted that no patentable weight is given to the phrases "the substance balances receipt of a to-be-controlled material", "wherein the interior chamber surface minimizes volatile compound upon a to-be-controlled material contacting the interior chamber surface", "wherein the surface blocks an etching material", "wherein the substance binds with silicon and minimizes Si-F bonding", "wherein the substance minimizes formation of a volatile compound", "wherein the substance minimizes SiF₄ formation" and "wherein the substance impedes reaction

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between the chamber surface and the to-be-controlled material "because in apparatus, article, and composition claims, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure/apparatus is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

Regarding claim 11, Frankel discloses that the chamber is cleaned in a chamber cleaning procedure (col 54, lines 39-41)

3. Claims 13-14, 16, 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Frankel et al (US 6,444,037)

Frankel discloses a method for fabricating an integrated circuit in an apparatus/chamber. This method comprises the steps of: providing an apparatus /chamber 15 having chamber wall/claimed interior chamber surface, the chamber wall /interior chamber surface comprises of aluminum/claimed a first material (col 38, lines 44-46)

performing a seasoning step to recombine all free F species or trapping the species to the chamber wall through silicon oxide deposition, the chamber 15 can trap fluorine atoms that may have been absorbed onto the surfaces of the chamber (col 56, lines 46-48; col 57, lines 23-25), which reads on incorporating a substance in the first material of the interior surface of the reactor chamber with the substance comprising a seasoning

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element or compound containing seasoning atoms or molecules that when combined with the chamber surface and or a material to be used in the reactor chamber are relatively less volatile than a combination , alone without the seasoning atoms or molecule

Regarding claim 14, Frankel discloses placing power residue in the chamber (col 38, lines 39-40), which reads on placing the seasoning element in solid form in the reaction chamber.

Regarding claim 16, Frankel discloses placing SiO₂/ power residue in the chamber (col 38, lines 39-40), which reads on a silicon-based compound

Regarding claim 17, Frankel discloses performing additional clean steps after the chamber clean (col 56, lines 17-18)

4. Claims 18-20, 22, 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Frankel et al (US 6,444,037)

Frankel discloses a method for fabricating an integrated circuit in an apparatus/chamber. This method comprises the steps of: providing an apparatus /reactor 15 having reactor wall/claimed interior surface of the reactor, the reactor wall /interior surface of the reactor comprises of aluminum/claimed a first material (col 38, lines 44-46)

a fluorine-based gas may begin to contaminate or to react with the aluminum chamber wall to form SiF₄ which is drawn out of the chamber (col 38, lines 35-45),

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which reads on incorporated a substance in the first material of the interior surface of the reactor to minimize an undesirable reaction at the surface and to prime the reactor forming an etched doped dielectric layer/etched product in the reactor (col 42, lines 13-15)

The limitations of claims 19, 20 have been discussed above.

Regarding claim 22, Frankel discloses producing an oxide layer (col 43, lines 55-57)

Regarding claim 23, Frankel discloses performing additional clean steps after the chamber clean (col 56, lines 17-18)

5. Claims 24-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Frankel et al (US 6,444,037)

performing a seasoning step to recombine all free F (fluorine) species or trapping the species to the chamber wall through silicon oxide deposition, the chamber 15 can trap fluorine atoms that may have been absorbed onto the surfaces of the chamber (col 56, lines 46-48; col 57, lines 23-25), which reads on incorporating a substance in the first material of the interior surface of the reactor chamber with the substance comprising a seasoning element, the fluorine-based gas can not react with the SiO₂ to form SiF₄ (col 38, lines 41-43), which reads on reducing the formation of volatile compounds when fluorine encounter the surface

conducting a cleaning step etches native oxide in the reactor using NF₃/fluorine gas (col 46, lines 10-54)

The limitation of claim 25 has been discussed above.

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Regarding claim 26, Frankel discloses performing additional clean steps after the chamber clean (col 56, lines 17-18)

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel et al (US 6,444,037) in view of Han et al (US 6,508,911)

Frankel's apparatus/chamber has been described above in paragraph 2. Frankel's apparatus differs from the claimed invention as per claim 8 by comprises of aluminum instead of silicon or SiC.

However, Han, in a method for coating plasma reactor, discloses that coated SiC and SiC/Si composite can be substituted for the aluminum chamber wall (col 9, lines 55-57)

Hence, one skilled in the art would have found it obvious to substitute Frankel's aluminum chamber with SiC in view of Han's teaching because both aluminum and SiC are known material used for the plasma chamber, thus the substitution of one for the other would have produced the expected result.

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8. Claims 10, 12, 15, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel et al (US 6,444,037) in view of Radhamohan et al (US 5,997,685)

Frankel's method has been described above in paragraph 3. Unlike the instant claimed inventions as per claims 10, 12, 15, Frankel does not specifically disclose the step of including cobalt in the at least one interior chamber surface/ placing cobalt-containing solid in the chamber.

Radhamohan discloses a method for processing semiconductor substrate using an apparatus comprises the step of using cobalt in the at least one interior chamber surface (col 6, lines 9-11)

Hence, one skilled in the art would have found it obvious to modify Frankel's method by including cobalt in the at least one interior chamber surface/ placing cobalt-containing solid in the chamber as per Radhamohan because Radhamohan states that additional element such as cobalt provide increase corrosion resistance, thermal shock resistance , or to improve other properties of the alloy used in the chamber (col 6, lines 10-14)

Response to Arguments

9. Applicant's arguments, see the first complete paragraph on page 6 of the response, filed 3/17/2004, with respect to the rejection of claim 18 under 35 USC& 112 have been fully considered and are persuasive. The rejection has been withdrawn.

Applicant's arguments filed 3/17/2004 with respect to the rejection(s) of claims 1-26 have been fully considered but they are not persuasive.

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Applicants argue that the combination of various elements recited in claims 1-7, 9, do not include intended use recitation as these claims do not use language that suggest or make optional, thus this claim language should be give patentable weight because according to MPEP & 2106 " the subject matter of a properly construed claim is defined by the term that limit its scope. It is this subject matter that must be examined". This argument is unpersuasive because the MPEP & 2111.03 also recites the following "in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim". Since claims 1-7, 9 of the instant claimed invention are drawn to a reactor/apparatus and the cited prior art of Frankel (US 6,444,037) discloses a fluorine-based gas may begin to contaminate or to react with the aluminum chamber wall of a reactor (col 36, lines 35-45), the examiner asserts that Frankel above-mentioned teaching reads on the claimed limitation of " a substance incorporated in the first material of the interior chamber surface". Thus, Frankel is capable of performing the claimed features of the invention.

The applicants also argue that Frankel removes residues formed on the chamber interior surface and does not add material to produce a less volatile combination. This argument is unpersuasive because as recited in col 56, lines 46-48 of Frankel, Frankel discloses performing a seasoning step to recombine all free F species or trapping the species to the chamber wall through silicon oxide deposition, the chamber 15 can trap fluorine atoms that may have been absorbed onto the surfaces of the chamber. Hence,

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the examiner asserts that Frankel discloses adding material to the chamber interior surface to produce a less volatile combination

It is argued that Frankel does not teach incorporating a substance in the first material of the interior surface to minimize an undesirable reactor because Frankel only uses a plasma etch. The examiner disagrees because as recited in col 38, lines 35-45, Frankel discloses a fluorine-based gas may begin to contaminate or to react with the aluminum chamber wall to form SiF_4 which is drawn out of the chamber which equates to incorporating a substance in the first material of the interior surface to minimize an undesirable reactor

Applicants further argue that Frankel does not teach seasoning atoms incorporates onto a first material of an interior surface of the reaction chamber. This argument is unpersuasive because in col 56, lines 46-48 and col 57, lines 23-25, Frankel discloses performing a seasoning step to recombine all free F (fluorine) species or trapping the species to the chamber wall through silicon oxide deposition, the chamber 15 can trap fluorine atoms that may have been absorbed onto the surfaces of the chamber (col 56, lines 46-48; col 57, lines 23-25),

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



LV

May 27, 2004